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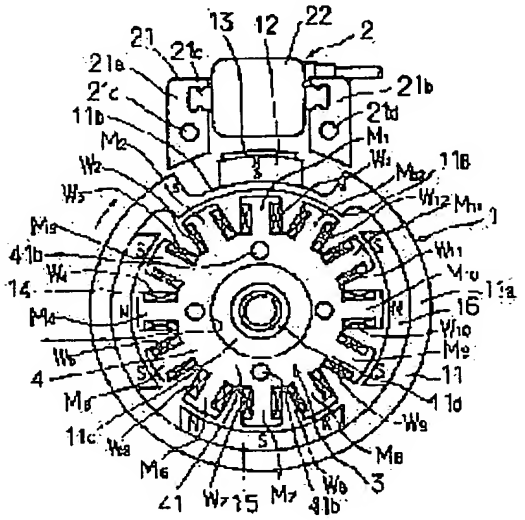
(54) FLYWHEEL MAGNET GENERATOR

(57)Abstract:
PURPOSE: To make the amplitude of an output voltage of a generating coil almost constant by constituting generating coils in such a manner that generator coils turned sequentially are connected in series at n-number of salient poles arranged alternately among 2n-number of salient poles of an armature iron core.
CONSTITUTION: Among 12 salient poles, 6 salient poles M1 to M9 alternately and M11 are a first salient pole group, other 6 salient poles M2 to M10 alternately and M12 are a second salient pole group, thus dividing the 12 salient poles into two salient pole groups. Then, generating coils W1 to W9 and W11 are sequentially turned in the same winding direction for the first salient pole group, these generating coils are connected in series thereby constituting generating coils for the first system. Also for the second salient pole groups, the same kind of second system generating coils are constituted. And while the magnetic rotor makes one turn, the voltage waveform created between the output ends of the first system generating coils has a waveform with almost constant amplitude.



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CLAIMS

[Claim(s)]
[Claim 1] While attaching a permanent magnet in the crevice for magnet anchoring formed by making a part of peripheral wall section of the iron flywheel formed in the shape of a cup into the configuration where it dented inside the direction of a path and constituting the magnet field for ignition in the periphery side of this peripheral wall section The flywheel magnet rotator which fixed the permanent magnet to the field except the part which ****s in said crevice for magnet anchoring of the inner circumference of this peripheral wall section, and constituted the magnet field for common loads of two or more poles, The armature for ignition which comes to wind the magneto coil for an ignition drive around the iron core which has the magnetic pole section which counters the magnet field for ignition by the side of the periphery of the peripheral wall of said flywheel, The armature for common loads which have become from the magneto coil wound around the salient pole section of an armature core and this armature core which has the 2n piece (n is two or more integers) salient pole section prepared in the radial by the equiangular distance, and each salient pole section was made to counter by the inside of said flywheel by said magnet field for general loads In the flywheel permanent magnet generator which it had, the n salient pole sections arranged alternately [of said armature core] as one salient pole group Divide said 2n piece salient pole section into the 1st and 2nd salient pole groups, connect to a serial the magneto coil wound around the n salient pole sections which constitute the 1st salient pole group in order, and the magneto coil of the 1st network is constituted. The flywheel permanent magnet generator characterized by having connected to the serial the magneto coil wound around the n salient pole sections which constitute the 2nd salient pole group in order, and constituting the magneto coil of the 2nd network.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the flywheel permanent magnet generator equipped with the armature for ignition used for an internal combustion engine's ignition, and the armature for common loads.
[0002]
[Description of the Prior Art] As a flywheel permanent magnet generator used in order to be attached in an internal combustion engine and to supply power to the ignition for internal combustion engines, and common loads (loads other than an ignition are meant.), such as a head lamp The flywheel magnet rotator which constituted the magnet field for ignition, and the magnet field for common loads in the periphery [of a flywheel], and inner circumference side, respectively, There is a thing equipped with the armature for ignition and the armature for common loads which carry out induction of the electrical potential difference for an ignition drive and the electrical potential difference for a common load drive by the flux reversal given by the magnet field for ignition and the magnet field for common loads, respectively.
[0003] In this kind of permanent magnet generator, a crevice is formed by making a part of peripheral wall section of a flywheel transform inside the direction of a path, and in order to attach the magnet which constitutes the magnet field for ignition in this crevice, the part (part which you were made to deform in order to form a crevice) which can never attach a magnet in the inner circumference side of a flywheel arises. Therefore, the magnet field for common loads constituted at the inner circumference side of a flywheel becomes the thing made to lack a part of 2n magnetic pole (for n to be two or more integers) which should be essentially prepared by the equiangular distance, and the alternating voltage obtained from the armature for common loads becomes that to which some of the waves were distorted.

[0004] Although drawing 1 shows the configuration of the permanent magnet generator of the example of this invention mentioned later, since the basic configuration is the same, except for the method of winding of the conventional permanent magnet generator of the permanent magnet generator of this invention of the magneto coil for common loads, the basic configuration is explained using drawing 1 . The flywheel magnet rotator 1 of this kind of generator The permanent magnet 12 attached in crevice 11b for magnet anchoring formed in a part of peripheral wall section 11a of the iron flywheel 11 formed in the shape of a cup, and this flywheel, It has the permanent magnet 14 attached in the inner circumference of the field except the part which ****s in crevice 11b for magnet anchoring of peripheral wall section 11a of a flywheel thru/or 16, and a flywheel 11 is attached in the revolving shaft of prime movers, such as an internal combustion engine. In this magnet rotator, the magnet field for ignition is constituted by a permanent magnet 12 and the peripheral wall section of the flywheel of those both sides, and the magnet field for common loads is constituted by a magnet 14 thru/or 16.
[0005] The armature 2 for ignition consists of an iron core 21 which has the magnetic pole section which counters the magnet field for ignition by the side of the periphery of the peripheral wall of a flywheel 11, and a magneto coil 22 for an ignition drive wound around this iron core, and is fixed to the anchoring section which has been arranged on the outside of a flywheel and prepared in an engine's case etc.
[0006] moreover, the 2n piece (this example n= 6) salient pole section M1 by which the armature 3 for

common loads was formed in the radial by the equiangular distance or each salient pole section of an armature core 4 which has M12 -- magneto coil W1 Or it consists of what wound W12, and each salient pole section is made to counter by the inside of the flywheel magnet rotator 1 by the magnet field for common loads.

[0007] In using the magneto coil of the armature 3 for common loads in this conventional kind of flywheel permanent magnet generator as a power source for lighting for turning on two lamps, such as a head lamp of a car, directly When one lamp is disconnected, in order to make it an excessive electrical potential difference not join the lamp of another side The n salient pole sections which adjoined the half-section of an armature core mutually among the 2n piece salient pole sections, and have been arranged as one salient pole group In the n salient pole sections which divide the 2n piece salient pole section into the 1st and 2nd salient pole groups, and constitute the 1st salient pole group, in order And the magneto-coil group which the direction of a volume was changed by turns, wound, and was connected to the serial, and the n salient pole sections which constitute the 2nd salient pole group -- sequence -- and the magneto-coil group which the direction of a volume was changed by turns, wound, and was connected to the serial as the magneto coil of the 1st network, and a magneto coil of the 2nd network, respectively He was trying to turn on two RAMBU with the magneto coil of these 1st and 2nd networks, respectively.

[0008] It sets to the generator which has the configuration shown in drawing 1 , and drawing 6 is the 12 salient pole sections M1. Or magneto coil W1 wound around M12, respectively Or it is what showed the conventional connection of W12. Conventionally, they are the six adjoining salient pole sections M1. Or magneto coil W1 which the direction of a volume was changed in M12 by turns, and was wound around it Or W6 The magneto coil of the 1st network is constituted by connecting with a serial. The six salient pole sections M7 which others adjoin Or magneto coil W7 which the direction of a volume was changed in M12 by turns, and was wound around it Or the magneto coil of the 2nd network was constituted by connecting W12 to a serial.

[0009] In the conventional flywheel permanent magnet generator, if the magnet rotator 1 rotates one time clockwise (the direction of an arrow head of illustration of drawing 1) the one salient pole section M1, for example, the salient pole section, in the salient pole section which constitutes the 1st salient pole group Magnetic flux phi 1 along which it passes it is shown in drawing 7 (A) -- as -- changing -- this flux reversal -- this salient pole section M1 Wound magneto coil W1 **** -- drawing 7 -- (-- B --) -- being shown -- a wave -- an electrical potential difference -- V -- one -- ' -- induction -- carrying out . In addition, the angle of rotation theta of the axis of abscissa of drawing 7 makes the condition which showed in drawing 1 the zero (theta= 0).

[0010] other salient pole sections M2 which constitute the 1st salient pole group, and M3, --, M6 The magneto coil W2 wound, respectively, W3, --, W6 It has 180 degrees (a machine angle 360 degrees/2 n= 30 degrees) phase contrast by the electrical angle one by one. ****, as shown in drawing 7 (C) thru/or drawing 7 (G) And induction of electrical-potential-difference V2 ' which the polarity reversed by turns, V3 ', --, V6 ' is carried out. therefore -- the -- one -- a network -- a magneto coil -- an outgoing end -- between -- **** -- V -- one -- ' -- V -- two -- ' -- V -- six -- ' -- having added -- drawing 7 -- (-- H --) -- being shown -- output voltage -- Va -- ' -- obtaining -- having . The same wave-like output voltage from which about 180 degrees of phases shifted on the machine square to Va ' also between the outgoing ends of the magneto coil of the 2nd network is obtained.

[0011]

[Problem(s) to be Solved by the Invention] In the conventional flywheel permanent magnet generator, since fluctuation arose in the amplitude of the output voltage generated between the output terminals of the magneto coil of the 1st and 2nd networks, respectively while a magnet rotator rotates one time as shown in drawing 7 (H), especially when a common load was a lamp, there was a problem that a flicker offensive to the eye arose, at the time of low-speed rotation of the engine with which an output frequency becomes low. Moreover, in the case of loads other than a lamp, the beat phenomenon might arise by the above-mentioned voltage variation.

[0012] The purpose of this invention is to offer the flywheel permanent magnet generator which enabled it to obtain the output voltage which does not almost have fluctuation of the amplitude from the magneto coil of each network, when the magneto coil of the armature for common loads which flux reversal is given by the magnet field in the condition that a part of magnetic pole was missing, and carries out

induction of the electrical potential difference is divided into the magneto coil of the 1st network, and the magneto coil of the 2nd network and it constitutes it.
[0013]
[Means for Solving the Problem] While this invention attaches a permanent magnet in the crevice for magnet anchoring formed by making a part of peripheral wall section of the iron flywheel formed in the shape of a cup into the configuration where it dented inside the direction of a path and constitutes the magnet field for ignition in the periphery side of this peripheral wall section The flywheel magnet rotator which fixed the permanent magnet to the field except the part which ****s in said crevice for magnet anchoring of the inner circumference of this peripheral wall section, and constituted two or more magnet fields for common loads, The armature for ignition which comes to wind the magneto coil for an ignition drive around the iron core which has the magnetic pole section which counters the magnet field for ignition by the side of the periphery of the peripheral wall of a flywheel, The armature for common loads which have become from the magneto coil wound around the salient pole section of an armature core and this armature core which has the 2n piece (n is two or more integers) salient pole section prepared in the radial by the equiangular distance, and each salient pole section was made to counter by the inside of a flywheel by the magnet field for common loads It is involved in the flywheel permanent magnet generator which it had.
[0014] In this invention, the 2n piece salient pole section is divided into the 1st and 2nd salient pole groups for the n salient pole sections arranged alternately [of an armature core] as one salient pole group. And the magneto coil wound around the n salient pole sections which constitute the 1st salient pole group in order is connected to a serial, the magneto coil wound around the n salient pole sections which constitute the magneto coil of the 1st network and constitute the 2nd salient pole group in order is connected to a serial, and the magneto coil of the 2nd network is constituted.
[0015]
[Function] If the generator coil wound around the n salient pole sections alternately arranged among the 2n piece salient pole sections of an armature core as mentioned above in order is connected to a serial and the magneto coil of the 1st and 2nd networks is constituted, respectively Although the amplitude of the electrical potential difference which carries out induction of the magneto coil of the 1st and 2nd networks to each n magneto coil constituted, respectively, respectively is changed while a magnet rotator rotates one time The electrical potential difference which carries out induction to n magneto coils of each network, respectively turns into the same wave-like electrical potential difference from which 360-degree [every] (machine angle 360 degrees/(n)) sequential phase shifted in the electrical angle. Since the synthetic electrical potential difference which applied the electrical potential difference which is n pieces from which 360-degree [every] (machine angle 360 degrees/(n)) sequential phase shifted in the electrical angle, respectively between the outgoing ends of the magneto coil of the 1st and 2nd networks is outputted, the amplitude of each output voltage of each network becomes almost fixed during 1 rotation of a magnet rotator, and is not changed.
[0016] Therefore, it can prevent a flicker arising at the time of low-speed rotation, when a lamp is driven with the output of the magneto coil of the 1st and 2nd networks, respectively, or a beat phenomenon arising, when other loads other than a lamp are driven.
[0017]
[Example] 3 is the armature for ignition by which drawing 1 was what showed the overall configuration of the example which applied this invention about the case where the number of the salient pole sections of an armature core is 12 (n= 6), 1 had been arranged at the flywheel magnet rotator and 2 has been arranged in this drawing at the periphery side of the flywheel magnet rotator 1, and ** which is the armature for common loads arranged inside the flywheel magnet rotator 1.
[0018] The flywheel magnet rotator 1 is equipped with the permanent magnets 14-16 fixed to the inner circumference of the field except the part which ****s in crevice 11b of the flywheel 11 made of cast iron of the shape of a cup of having formed crevice 11b for magnet anchoring, one permanent magnet 12 attached in crevice 11b for magnet anchoring, and the peripheral wall section of a flywheel by making a part of peripheral wall section into the configuration where it dented inside the direction of a path.
[0019] Furthermore, if it explains in full detail, the permanent magnet 12 is magnetized in the direction of a path of a flywheel, a pole piece 13 is contacted by the pole face of the outside of the direction of a path of this permanent magnet 12, and the magnet 12 and the pole piece 13 are being fixed to the

flywheel 11 with the screw which was made to penetrate this pole piece 13 and a magnet 12, and was formed and which is not illustrated. The pole piece 13 is formed so that it may be located on the cylinder side as the peripheral face of the part except crevice 11b of peripheral wall section 11a of a flywheel where the peripheral face is the same, and the magnet field for ignition is constituted by the permanent magnet 12 and the pole piece 13, and the peripheral face of peripheral wall section 11a of a flywheel.
[0020] The part which ****s in crevice 11b for magnet anchoring of peripheral wall section 11a of a flywheel is formed so that it may project inside the direction of a path rather than other parts of peripheral wall section 11a, and it constitutes simulation magnetic pole 11B, and ****** of this simulation magnetic pole 11B is set up equally to each ****** of magnets 14-16. Magnets 14-16 and simulation magnetic pole 11B have include-angle spacing of 90 degrees, and are arranged.
[0021] The predetermined field of permanent magnets 14-16 is magnetized in the direction of a path, a total of nine magnetic poles are formed, and the magnet field for common loads is constituted from this example by these nine magnetic poles so that the different polar magnetic poles N, S, and N and different -- by turns may be located in a line at intervals of the include angle of 30 degrees (= 360/12 degree). This magnet field for common loads is equivalent to what replaced three magnetic poles in the magnet field of the magnet rotator of 12 poles by simulation magnetic pole 11B.
[0022] 11d of boss sections formed in the center section of bottom wall section 11c of a flywheel 11 at one at this bottom wall section is prepared, this boss section is attached in the revolving shaft of prime movers, such as an internal combustion engine, and the flywheel magnet rotator 1 is attached in a prime mover.
[0023] One pair of leg sections 21a and 21b which have the magnetic pole section to which the armature 2 for ignition counters the magnet field for ignition of the outside of a flywheel 11 through a predetermined small gap in an end side, respectively, It consists of an iron core 21 of the shape of a KO character equipped with cylindrical iron core section 21c which connects between these leg sections, and a magneto coil 22 for an ignition drive wound around cylindrical iron core section 21c of this iron core. This armature 2 for ignition is attached in an engine's crank case etc. by the mounting screw which was prepared in the leg sections 21a and 21b, respectively, which attaches and is inserted in 21d of holes and which is not illustrated.
[0024] The magneto coil 22 for an ignition drive is suitably constituted according to the configuration of the ignition used. For example, when the ignition of a capacitor discharge type is used, in order to enable it to charge the capacitor for ignition energy are recording to an electrical potential difference high enough with the induced voltage, a narrow diameter conductor is used for a magneto coil 22, and it is wound many times. Moreover, when the ignition of a primary-current cutoff form is used, in order to enable it to pass the primary current of sufficient magnitude, a magneto coil 22 uses the conductor of a comparatively thick path, and is wound. Moreover, the ignition coil which has a primary coil and a secondary coil in an iron core 21 may be wound, and the primary coil of this ignition coil may be used as the magneto coil for an ignition drive.
[0025] The armature 3 for common loads consists of an armature core 4 which consists of a layered product of a steel plate, and a magneto coil wound around this armature core. An armature core 4 consists of a stellate multi-electrode iron core which made 12 salient pole section M1 -M12 (2n piece) project from the annular yoke section 41 to a radial by the equiangular distance, and the magnetic pole section at each tip of salient pole section M1 -M12 is made to counter it through a predetermined small gap by the magnet field for common loads of the flywheel magnet rotator 1. The six salient pole sections M1 alternately arranged among the 12 salient pole sections in this invention, M3, M5, M7, and M9 And M11 is made into the 1st salient pole group. The 12 salient pole sections are divided into two salient pole groups for the six salient pole sections M2 arranged alternately [other], M4, M6, M8, and M10 and M12 as 2nd salient pole group. And as shown in drawing 2 the six salient pole sections M1 which constitute the 1st salient pole group, M3, M5, M7, and M9 M11 [and] -- respectively -- a magneto coil W1, W3, W5, W7, and W9 And make the direction of a volume the same, carry out sequential winding of W11, and these magneto coils are connected to a serial. These six magneto coils constitute the magneto coil of the 1st network. Moreover, respectively the direction of a volume is made the same, sequential winding of a magneto coil W2, W4 and W6, W8, and W10 and W12 is carried out the six salient pole sections M2 which constitute the 2nd salient pole group, M4, M6, M8, and M10 and M12, these magneto coils are connected to a serial, and these six magneto coils constitute the magneto coil of the 2nd network.

Leader lines 51a and 51b are pulled out outside, respectively from the volume start of the magneto coil of the 1st network, and the end of a volume, and leader lines 52a and 52b are pulled out outside, respectively from the volume start of the magneto coil of the 2nd network, and the end of a volume.
[0026] The armature 3 for common loads is attached in the crank case of the engine which does not illustrate by the mounting screw which was prepared in the annular yoke section 41 of an armature core, and which attaches and is inserted in Holes 41b and 41b and -- etc.
[0027] In the above-mentioned flywheel permanent magnet generator, if the magnet rotator 1 rotates, an electrical potential difference will carry out induction to each magneto coil which the magnetic flux which the magnetic flux which flows an iron core 21 by the magnet field for ignition changes, and the electrical potential difference for an ignition drive carries out induction to the magneto coil 22 of the armature 2 for ignition, and flows in each salient pole section of an armature core 4 by the magnet field for common loads changed, and was wound around this salient pole section.
[0028] Drawing 3 (A) is the salient pole section M1 of an armature core 4, when the magnet rotator 1 rotates clockwise in drawing 1 . Flowing magnetic flux phi 1 It is what showed the wave and the angle of rotation theta of an axis of abscissa makes the condition which showed in drawing 1 the zero (theta= 0). This magnetic flux phi 1 A wave turns into a wave with symmetrical left half part (theta=-180 degree-0 degree) and right half part (theta= 0 degree - 180 degrees) to the location of theta= 0, as shown also in this drawing. the salient pole section M1 Wound magneto coil W1 **** -- magnetic flux phi 1 of this salient pole section Wave-like electrical potential difference V1 shown in drawing 3 (B) by the temporal response Induction is carried out. Other salient pole sections M3 which constitute the 1st salient pole group of an armature core 4, M5, M7, and M9 The magnetic flux which reaches and flows M11 is the salient pole section M1. Flowing magnetic flux phi 1 Since it becomes the same wave from which it received and 360-degree [every] (it is 360 degrees/6 at machine angle) phase shifted one by one in the electrical angle Each of other magneto-coil W3 which constitutes the magneto coil of the 1st network wound around this each salient pole section, respectively, W5, W7, and W9 and in W11 As shown in drawing 3 (C) thru/or drawing 3 (G), respectively, it is a magneto coil W1. Induced voltage V1 The same wave-like electrical potential difference V3 from which it received and 360-degree [every] (it is 360 degrees/6 at machine angle) phase shifted one by one in the electrical angle, V5, V7, and V9 And V11 carries out induction.
[0029] Electrical potential difference Va produced between the output terminals of the magneto coil of the 1st network A magneto coil W1, W3, W5, W7, and W9 And the electrical potential difference V1 which carries out induction to W11, respectively, V3, V5, and V7 and V9 And although it becomes the synthetic electrical potential difference which added V11 This synthetic electrical potential difference Va Each six forward half waves and each six negative half waves Since it becomes almost equal [all] to what added each six forward half waves of the induced voltage (for example, V1) of one magneto coil, and each six negative half waves, respectively Electrical potential difference Va produced between the outgoing ends of the magneto coil of the 1st network while a magnet rotator rotates one time A wave becomes almost fixed [the amplitude], as shown in drawing 3 (H). the electrical potential difference which similarly a magneto coil W2, W4, W6, W8, and W10 and W12 produce between the outgoing ends of the magneto coil of the 2nd network connected to the serial -- the amplitude -- ** -- it becomes a fixed wave.
Therefore, when a flicker does not arise on this lamp when a lamp is driven as a common load, respectively with the output of the magneto coil of the 1st network, and the output of the magneto coil of the 2nd network, and other loads are driven as a common load, a beat phenomenon etc. does not occur.
[0030] Although the armature core of the armature for common loads is constituted from an above-mentioned example by 12 poles, in this invention, the pole of this armature core is arbitrary, and when using for the armature for common loads the armature core which generally has the 2n piece (n is two or more integers) salient pole section, it can apply this invention.
[0031] for example, drawing 4 -- eight salient pole section M1 -M8 the case where the armature core 4 which it has is used -- salient pole section M1 -M8 **** -- magneto-coil W1 -W8 It is wound. In this case, six magnetic poles with which the predetermined field of the magnets 14-16 fixed to the inner circumference of a flywheel is magnetized in the direction of a path, and is located in a line at intervals of the include angle of 45 degrees (= 360/8 times) are formed, and the magnet field for common loads is constituted by these magnetic poles. The magnet field for common loads of this example is equivalent to

what replaced two of eight magnetic poles of the magnet rotator of eight poles by simulation magnetic pole 11B.

[0032] The four salient pole sections M1 arranged alternately [of an armature core 4] in the example of drawing 4 , M3, and M5 And M7 Four magneto coils W1 which were wound in order in the same direction of a volume, and were connected to the serial, W3, and W5 And W7 The magneto coil of the 1st network is constituted. The four salient pole sections M2 arranged alternately [other], M4, and M6 And M8 Four magneto coils W2 which were wound in order in the same direction of a volume, and were connected to the serial, W4, and W6 And W8 The magneto coil of the 2nd network is constituted.

[0033] Drawing 5 (A) is the salient pole section M1 of the example of drawing 4 . Flowing magnetic flux phi 1 It is what showed the wave and the angle-of-rotation location theta of the magnet rotator 1 has shown the condition of drawing 4 as a zero (theta= 0). Drawing 5 (B) is the salient pole section M1. Wound magneto coil W1 Induced voltage V1 It is what showed the wave and is this electrical potential difference V1. A wave turns into a wave with symmetrical left half part (theta=-180 degree-0 degree) and right half part (theta= 0 degree - 180 degrees) to the location of theta= 0. Other magneto-coil W3 which constitutes the magneto coil of the 1st network, and W5 And W7 The electrical potential difference which carries out induction, respectively Magneto coil W1 Induced voltage V1 It becomes the same wave from which it received and 360-degree [every] (it is 360 degrees/4 at machine angle) phase shifted in the electrical angle. Electrical potential difference Va obtained between the outgoing ends of the magneto coil of the 1st network while a magnet rotator rotates one time Each four forward half waves and four negative half waves Induced voltage V1 of one magneto coil (for example, magneto coil W1) It becomes the almost same wave as what added four forward half waves and four negative half waves, respectively. Therefore, electrical potential difference Va obtained between the outgoing ends of the magneto coil of the 1st network while a magnet rotator rotates one time The amplitude becomes almost fixed as shown in drawing 5 (C). Similarly, while a rotator rotates one time, it becomes almost fixed [the amplitude of the electrical potential difference obtained between the outgoing ends of the magneto coil of the 2nd network].

[0034]

[Effect of the Invention] As mentioned above, the magneto coil of the 1st and 2nd networks is constituted by connecting to a serial the magneto coil wound around the salient pole section arranged alternately [of the armature core of the armature for common loads] has the 2n piece salient pole section prepared by the equiangular distance, respectively according to this invention. Since it was made to drive a general load with the output of the magneto coil of these 1st and 2nd networks, respectively, the amplitude of the output voltage of the magneto coil of each network can be mostly made regularity. Therefore, it can prevent this lamp flickering at the time of low-speed rotation, in carrying out the lighting drive of the lamp as a common load, and when driving other loads as a common load, a possibility that a beat phenomenon etc. may arise can be abolished.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram having shown the overall configuration of the example of this invention.
[Drawing 2] It is the connection diagram of the magneto coil in drawing 1 .
[Drawing 3] It is the wave form chart having shown the magnetic-flux wave of the example of drawing 1 , and the voltage waveform of each part.
[Drawing 4] It is the block diagram having shown the overall configuration of other examples of this invention.
[Drawing 5] It is the wave form chart having shown the magnetic-flux wave of the example of drawing 4 , and the voltage waveform of each part.
[Drawing 6] It is the connection diagram having shown connection of the magneto coil in the conventional example.
[Drawing 7] It is the wave form chart having shown the magnetic-flux wave in the conventional generator, and the voltage waveform of each part.
[Description of Notations]
1 Flywheel Magnet Rotator
2 Armature for Ignition
3 Armature for General Loads
4 Armature Core
11 Flywheel
11a Peripheral wall section
11b The crevice for magnet anchoring
11B Simulation magnetic pole
11c Bottom wall section
11d Boss section
12 Permanent Magnet
13 Pole Piece
14-16 Permanent magnet
21 Iron Core
21a, 21b Leg section
21c Cylindrical iron core section
21d Anchoring hole
22 Magneto Coil
41 Yoke Section
51a, 51b, 52a, 52b Leader line

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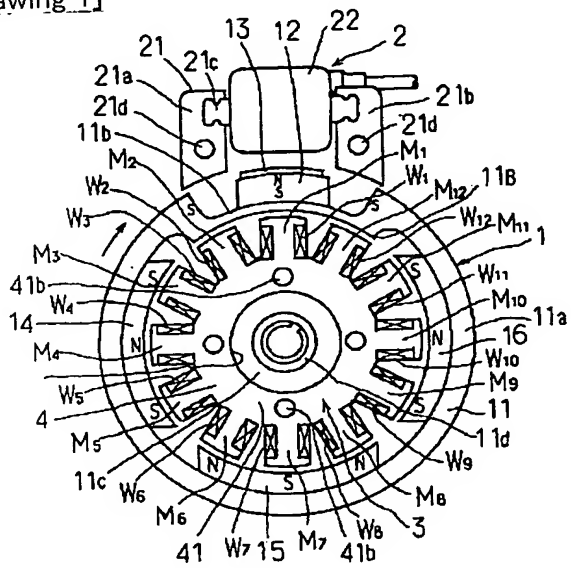
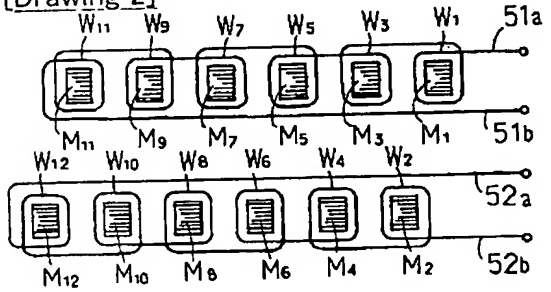
* NOTICES *

DRAWINGS

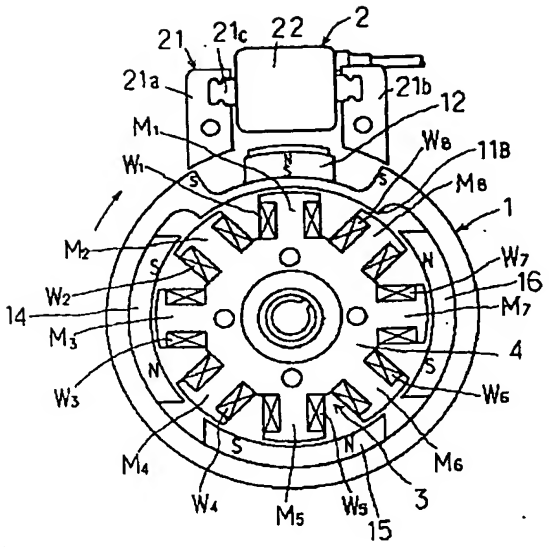
[Drawing 1]



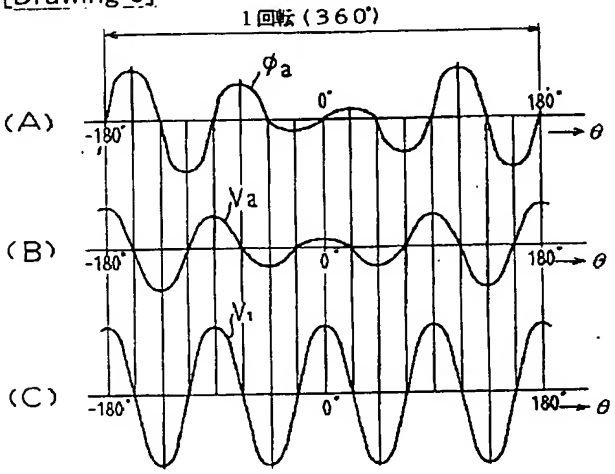
[Drawing 2]



[Drawing 4]



[Drawing 5]



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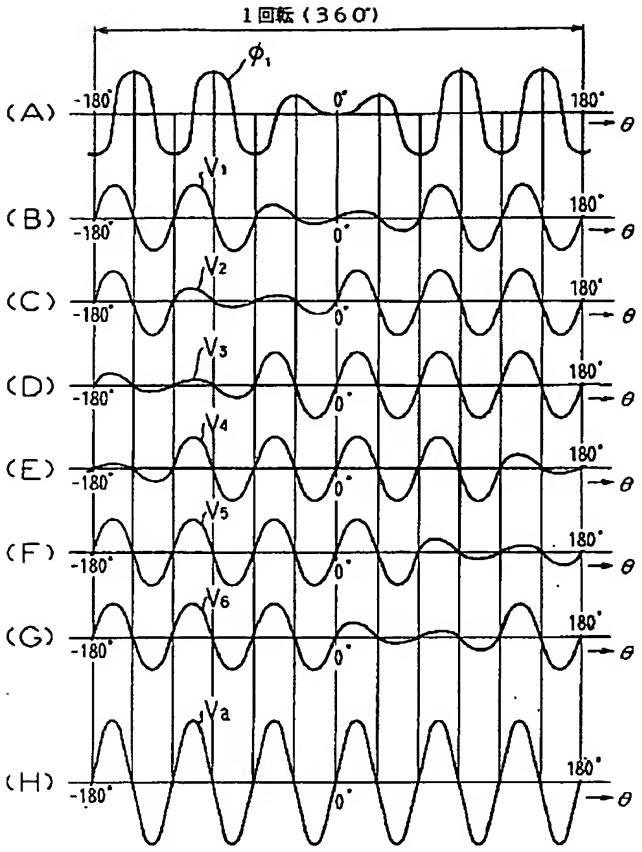

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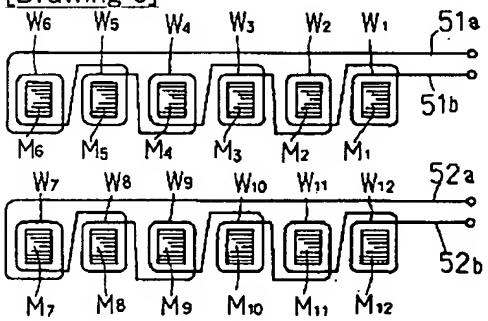

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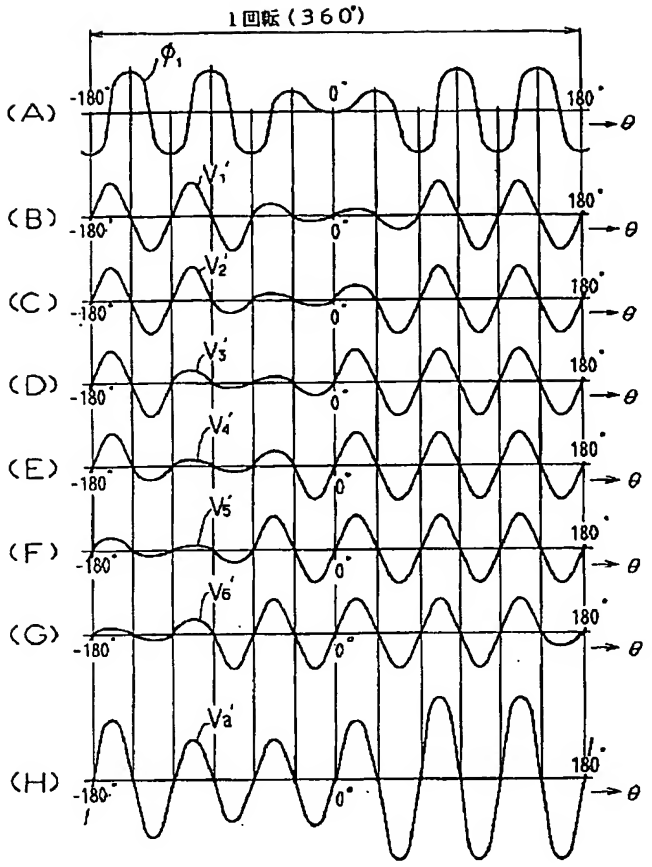

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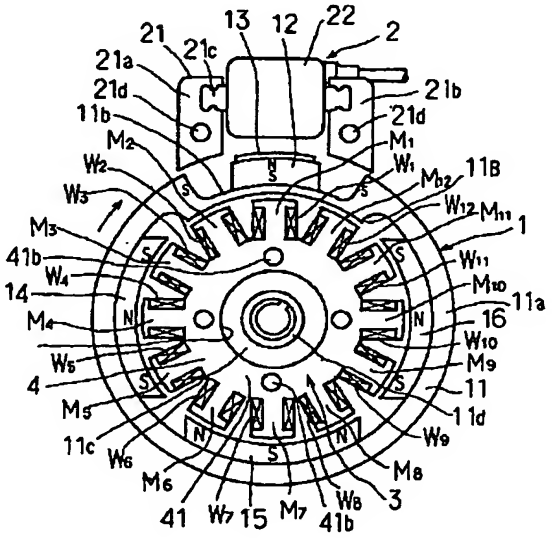
(54)【発明の名称】　フライホイール磁石発電機

(57)【要約】

【目的】磁極の一部が欠落した磁石回転子を用いた場合でも、波形歪みがない出力電圧を発生するフライホイール磁石発電機を提供する。

【構成】フライホイール１１の周壁部１１ａの一部に設けた凹部１１ｂ内に点火用磁石界磁を構成する磁石１２を取り付け、周壁部１１ａの凹部１１ｂに相応する部分以外の部分の内周に磁石１４～１６を取り付けて一般負荷用の磁石界磁を構成する。１２極の電機子鉄心４の１つ置きの突極部M1，M3，…M11に順次巻回して直列に接続した発電コイルW1，W3，…W11を第１の系統の発電コイルとし、他の１つ置きの突極部M2，M4，…M12に順次巻回して直列に接続した発電コイルW2，W4，…W12を第２の系統の発電コイルとして、これら第１及び第２の系統の発電コイルにより、点火装置以外の一般負荷を駆動する。



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【特許請求の範囲】

【請求項１】　カップ状に形成された鉄製フライホイールの周壁部の一部を径方向の内側に凹んだ形状とすることにより形成した磁石取付け用凹部内に永久磁石を取り付けて該周壁部の外周側に点火用磁石界磁を構成するとともに、該周壁部の内周の前記磁石取付け用凹部に相応する部分を除いた領域に永久磁石を固定して複数極の一般負荷用磁石界磁を構成したフライホイール磁石回転子と、

前記フライホイールの周壁の外周側の点火用磁石界磁に対向する磁極部を有する鉄心に点火装置駆動用の発電コイルを巻回してなる点火用電機子と、

等角度間隔で放射状に設けられた２ｎ個（ｎは２以上の整数）の突極部を有する電機子鉄心と該電機子鉄心の突極部に巻かれた発電コイルとからなっていて前記フライホイールの内側で各突極部が前記一般負荷用磁石界磁に対向させられた一般負荷用電機子とを備えたフライホイール磁石発電機において、

前記電機子鉄心の一つ置きに配置されたｎ個の突極部を１つの突極群として、前記２ｎ個の突極部を第１及び第２の突極群に分け、

第１の突極群を構成するｎ個の突極部に順番に巻回した発電コイルを直列に接続して第１の系統の発電コイルを構成し、

第２の突極群を構成するｎ個の突極部に順番に巻回した発電コイルを直列に接続して第２の系統の発電コイルを構成したことを特徴とするフライホイール磁石発電機。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、内燃機関の点火装置に用いられる点火用電機子と一般負荷用電機子とを備えたフライホイール磁石発電機に関するものである。

【０００２】

【従来の技術】内燃機関に取付けられて、内燃機関用点火装置と、ヘッドランプ等の一般負荷（点火装置以外の負荷を意味する。）とに電力を供給するために用いられるフライホイール磁石発電機として、フライホイールの外周側及び内周側にそれぞれ点火用の磁石界磁及び一般負荷用の磁石界磁を構成したフライホイール磁石回転子と、点火用の磁石界磁及び一般負荷用の磁石界磁によりそれぞれ与えられる磁束変化により点火装置駆動用の電圧及び一般負荷駆動用の電圧を誘起する点火用電機子及び一般負荷用電機子とを備えたものがある。

【０００３】この種の磁石発電機では、フライホイールの周壁部の一部を径方向の内側に変形させることにより凹部を形成して、該凹部内に点火用磁石界磁を構成する磁石を取り付けるため、フライホイールの内周側にどうしても磁石を取り付けることができない部分（凹部を形成するために変形させられた部分）が生じる。そのため、フライホイールの内周側に構成される一般負荷用の

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磁石界磁は、本来等角度間隔で設けられるべき２ｎ個（ｎは２以上の整数）の磁極の一部を欠落させたものとなり、一般負荷用電機子から得られる交流電圧はその一部の波形が歪んだものとなる。

【０００４】図１は後述する本発明の実施例の磁石発電機の構成を示したものであるが、従来の磁石発電機も本発明の磁石発電機も、一般負荷用発電コイルの巻回のしかたを除き、その基本構成は同一であるので、図１を用いてその基本構成を説明する。この種の発電機のフライホイール磁石回転子１は、カップ状に形成された鉄製のフライホイール１１と、該フライホイールの周壁部１１ａの一部に形成された磁石取付け用凹部１１ｂ内に取り付けられた永久磁石１２と、フライホイールの周壁部１１ａの磁石取付け用凹部１１ｂに相応する部分を除いた領域の内周に取り付けられた永久磁石１４ないし１６とを備えていて、フライホイール１１が内燃機関等の原動機の回転軸に取り付けられる。この磁石回転子においては、永久磁石１２とその両側のフライホイールの周壁部とにより点火用磁石界磁が構成され、磁石１４ないし１６により一般負荷用磁石界磁が構成されている。

【０００５】点火用電機子２は、フライホイール１１の周壁の外周側の点火用磁石界磁に対向する磁極部を有する鉄心２１と、該鉄心に巻回された点火装置駆動用の発電コイル２２とからなり、フライホイールの外側に配置されて機関のケース等に設けられた取付け部に固定される。

【０００６】また一般負荷用電機子３は、等角度間隔で放射状に設けられた２ｎ個（この例ではｎ＝６）の突極部M1 ないしM12を有する電機子鉄心４の各突極部に発電コイルW1 ないしW12を巻回したものからなっていて、フライホイール磁石回転子１の内側で各突極部が一般負荷用磁石界磁に対向させられる。

【０００７】従来のこの種のフライホイール磁石発電機において、一般負荷用電機子３の発電コイルを例えば車両のヘッドランプ等の２個のランプを直接点灯するための点灯用電源として用いる場合には、一方のランプが断線した場合に他方のランプに過大な電圧が加わることがないようにするために、２ｎ個の突極部のうち電機子鉄心の半部に互いに隣接して配置されたｎ個の突極部を１つの突極群として、２ｎ個の突極部を第１及び第２の突極群に分け、第１の突極群を構成するｎ個の突極部に順番にかつ交互に巻き方向を異ならせて巻回して直列に接続した発電コイル群、及び第２の突極群を構成するｎ個の突極部に順番にかつ交互に巻き方向を異ならせて巻回して直列に接続した発電コイル群をそれぞれ第１の系統の発電コイル及び第２の系統の発電コイルとして、該第１及び第２の系統の発電コイルによりそれぞれ２個のランプを点灯するようにしていた。

【０００８】図６は、図１に示した構成を有する発電機において、１２個の突極部M1 ないしM12にそれぞれ巻

回された発電コイルW1 ないしW12の従来の結線を示したもので、従来は、隣接する６個の突極部M1 ないしM12に交互に巻き方向を異ならせて巻回された発電コイルW1 ないしW6 を直列に接続することにより第１の系統の発電コイルを構成し、他の隣接する６個の突極部M7 ないしM12に交互に巻き方向を異ならせて巻回された発電コイルW7 ないしW12を直列に接続することにより第２の系統の発電コイルを構成していた。

【０００９】従来のフライホイール磁石発電機において、磁石回転子１が時計方向（図１の図示の矢印方向）に１回転すると、第１の突極群を構成する突極部の中の１つの突極部、例えば突極部M1 を通る磁束φ1 は図７（Ａ）に示すように変化し、この磁束変化により該突極部M1 に巻回された発電コイルW1 には図７（Ｂ）に示す波形の電圧V1 ´が誘起する。なお、図７の横軸の回転角θは、図１に示した状態を原点（θ＝０）としている。

【００１０】第１の突極群を構成する他の突極部M2 , M3 , …, M6 にそれぞれ巻回された発電コイルW2 , W3 , …, W6 には図７（Ｃ）ないし図７（Ｇ）に示すように順次電気角で１８０°（機械角では３６０°／２ｎ＝３０°）の位相差をもち、且つ交互に極性が反転した電圧V2 ´, V3 ´, …, V6 ´が誘起される。従って第１の系統の発電コイルの出力端間にはV1 ´, V2 ´, …, V6 ´を加算した図７（Ｈ）に示す出力電圧Ｖａ´が得られる。第２の系統の発電コイルの出力端間にも、Ｖａ´に対して機械角で１８０°位相がずれた同様な波形の出力電圧が得られる。

【００１１】

【発明が解決しようとする課題】従来のフライホイール磁石発電機では、図７（Ｈ）に示したように、磁石回転子が１回転する間に、第１及び第２の系統の発電コイルの出力端子間にそれぞれ発生する出力電圧の振幅に変動が生じるため、一般負荷がランプである場合には、特に出力周波数が低くなる機関の低速回転時に目障りなちらつきが生じるという問題があった。またランプ以外の負荷の場合には、上記の電圧変動によりうなり現象が生じることがあった。

【００１２】本発明の目的は、磁極の一部が欠落した状態にある磁石界磁により磁束変化が与えられて電圧を誘起する一般負荷用電機子の発電コイルを第１の系統の発電コイルと第２の系統の発電コイルとに分けて構成する場合に、各系統の発電コイルから振幅の変動がほとんどない出力電圧を得ることができるようにしたフライホイール磁石発電機を提供することにある。

【００１３】

【課題を解決するための手段】本発明は、カップ状に形成された鉄製フライホイールの周壁部の一部を径方向の内側に凹んだ形状とすることにより形成した磁石取付け用凹部内に永久磁石を取り付けて該周壁部の外周側に点

火用磁石界磁を構成するとともに、該周壁部の内周の前記磁石取付け用凹部に相応する部分を除いた領域に永久磁石を固定して複数の一般負荷用磁石界磁を構成したフライホイール磁石回転子と、フライホイールの周壁の外周側の点火用磁石界磁に対向する磁極部を有する鉄心に点火装置駆動用の発電コイルを巻回してなる点火用電機子と、等角度間隔で放射状に設けられた２ｎ個（ｎは２以上の整数）の突極部を有する電機子鉄心と該電機子鉄心の突極部に巻かれた発電コイルとからなっていてフライホイールの内側で各突極部が一般負荷用磁石界磁に対向させられた一般負荷用電機子とを備えたフライホイール磁石発電機に係わるものである。

【００１４】本発明においては、電機子鉄心の一つ置きに配置されたｎ個の突極部を１つの突極群として、２ｎ個の突極部を第１及び第２の突極群に分ける。そして、第１の突極群を構成するｎ個の突極部に順番に巻回した発電コイルを直列に接続して第１の系統の発電コイルを構成し、第２の突極群を構成するｎ個の突極部に順番に巻回した発電コイルを直列に接続して第２の系統の発電コイルを構成する。

【００１５】

【作用】上記のように電機子鉄心の２ｎ個の突極部のうち１つ置きに配置されたｎ個の突極部に順番に巻回された発電機コイルを直列に接続してそれぞれ第１及び第２の系統の発電コイルを構成すると、磁石回転子が１回転する間に、第１及び第２の系統の発電コイルをそれぞれ構成するｎ個の各発電コイルにそれぞれ誘起する電圧の振幅は変動するが、各系統のｎ個の発電コイルにそれぞれ誘起する電圧は電気角で３６０°（機械角では３６０°／ｎ）ずつ順次位相がずれた同じ波形の電圧となる。第１及び第２の系統の発電コイルの出力端間には、それぞれ電気角で３６０°（機械角では３６０°／ｎ）ずつ順次位相がずれたｎ個の電圧を加え合わせた合成電圧が出力されるので、各系統のそれぞれの出力電圧の振幅は磁石回転子の１回転中ほぼ一定となり、変動することがない。

【００１６】そのため、第１及び第２の系統の発電コイルの出力によりそれぞれランプを駆動した場合に低速回転時にちらつきが生じたり、ランプ以外の他の負荷を駆動した場合にうなり現象が生じたりするのを防ぐことができる。

【００１７】

【実施例】図１は電機子鉄心の突極部の数が１２個（ｎ＝６）の場合について本発明を適用した実施例の全体的な構成を示したもので、同図において１はフライホイール磁石回転子、２はフライホイール磁石回転子１の外周側に配置された点火用電機子、３はフライホイール磁石回転子１の内側に配置された一般負荷用電機子である。

【００１８】フライホイール磁石回転子１は、周壁部の

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一部を径方向の内側に凹んだ形状とすることにより磁石取付け用凹部１１ｂを形成したカップ状の鋳鉄製フライホイール１１と、磁石取付け用凹部１１ｂ内に取り付けられた１個の永久磁石１２と、フライホイールの周壁部の凹部１１ｂに相応する部分を除く領域の内周に固定された永久磁石１４～１６とを備えている。

【００１９】更に詳述すると、永久磁石１２は、フライホイールの径方向に着磁されていて、該永久磁石１２の径方向の外側の磁極面には磁極片１３が当接され、該磁極片１３と磁石１２とを貫通させて設けられた図示しないネジにより磁石１２と磁極片１３とがフライホイール１１に固定されている。磁極片１３は、その外周面がフライホイールの周壁部１１ａの凹部１１ｂを除く部分の外周面と同一の円筒面上に位置するように形成されていて、永久磁石１２及び磁極片１３と、フライホイールの周壁部１１ａの外周面とにより点火用磁石界磁が構成されている。

【００２０】フライホイールの周壁部１１ａの磁石取付け用凹部１１ｂに相応する部分は、周壁部１１ａの他の部分よりも径方向の内側に突出するように形成されて模擬磁極１１Ｂを構成しており、該模擬磁極１１Ｂの極弧角は、磁石１４～１６のそれぞれの極弧角に等しく設定されている。磁石１４～１６と模擬磁極１１Ｂとは、９０度の角度間隔をもって配置されている。

【００２１】本実施例では、交互に異なる極性の磁極Ｎ，Ｓ，Ｎ，…が３０度（＝３６０／１２度）の角度間隔で並ぶように、永久磁石１４～１６の所定の領域が径方向に着磁されて合計９個の磁極が形成され、これら９個の磁極により一般負荷用磁石界磁が構成されている。この一般負荷用磁石界磁は、１２極の磁石回転子の磁石界磁の内の３個の磁極を模擬磁極１１Ｂで置き換えたものに相当している。

【００２２】フライホイール１１の底壁部１１ｃの中央部には該底壁部に一体に形成されたボス部１１ｄが設けられ、該ボス部が内燃機関等の原動機の回転軸に嵌着されてフライホイール磁石回転子１が原動機に取り付けられる。

【００２３】点火用電機子２は、フライホイール１１の外側の点火用磁石界磁に所定の小ギャップを介して対向する磁極部をそれぞれ一端側に有する１対の鉄心脚部２１ａ及び２１ｂと、これらの鉄心脚部間を連結する棒状鉄心部２１ｃとを備えたコ字状の鉄心２１と、該鉄心の棒状鉄心部２１ｃに巻回された点火装置駆動用の発電コイル２２とからなっている。この点火用電機子２は、鉄心脚部２１ａ及び２１ｂにそれぞれ設けられた取付け孔２１ｄに挿入される図示しない取付ねじにより機関のクランクケース等に取り付けられる。

【００２４】点火装置駆動用の発電コイル２２は、使用される点火装置の構成に応じて適宜に構成される。例えばコンデンサ放電式の点火装置が使用される場合、発電

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コイル２２は、その誘起電圧で点火エネルギー蓄積用コンデンサを十分に高い電圧まで充電し得るようにするために、細径の導体を用いて多数回巻回される。また一次電流遮断形の点火装置が使用される場合には、十分な大きさの１次電流を流し得るようにするために、発電コイル２２が比較的太い径の導体を用いて巻回される。また鉄心２１に１次コイル及び２次コイルを有する点火コイルを巻回して、該点火コイルの１次コイルを点火装置駆動用の発電コイルとする場合もある。

【００２５】一般負荷用電機子３は、鋼板の積層体からなる電機子鉄心４と、該電機子鉄心に巻回された発電コイルとからなる。電機子鉄心４は、環状の継鉄部４１から等角度間隔で放射状に１２個（２ｎ個）の突極部M1～M12を突出させた星形多極鉄心からなり、突極部M1～M12のそれぞれの先端の磁極部がフライホイール磁石回転子１の一般負荷用磁石界磁に所定の小ギャップを介して対向させられている。本発明においては、１２個の突極部の内、１つ置きに配置された６個の突極部M1，M3，M5，M7，M9 及びM11を第１の突極群とし、他の１つ置きに配置された６個の突極部M2，M4，M6，M8，M10及びM12を第２の突極群として、１２個の突極部を２つの突極群に分ける。そして、図２に示すように、第１の突極群を構成する６個の突極部M1，M3，M5，M7，M9 及びM11にそれぞれ発電コイルW1，W3，W5，W7，W9 及びW11を巻き方向を同じにして順次巻回してこれらの発電コイルを直列に接続し、これら６個の発電コイルにより第１の系統の発電コイルを構成する。また第２の突極群を構成する６個の突極部M2，M4，M6，M8，M10及びM12にそれぞれ発電コイルW2，W4，W6，W8，W10及びW12を巻き方向を同じにして順次巻回して、これらの発電コイルを直列に接続し、これら６個の発電コイルにより第２の系統の発電コイルを構成する。第１の系統の発電コイルの巻始め及び巻終りからそれぞれ引出線５１ａ及び５１ｂが外部に引出され、第２の系統の発電コイルの巻始め及び巻終りからそれぞれ引出線５２ａ及び５２ｂが外部に引き出されている。

【００２６】一般負荷用電機子３は、電機子鉄心の環状の継鉄部４１に設けられた取付け孔４１ｂ，４１ｂ，…に挿入される取付けねじにより図示しない機関のクランクケース等に取り付けられる。

【００２７】上記のフライホイール磁石発電機において、磁石回転子１が回転すると、点火用磁石界磁により鉄心２１を流れる磁束が変化して点火用電機子２の発電コイル２２に点火装置駆動用の電圧が誘起し、また一般負荷用磁石界磁により電機子鉄心４の各突極部に流れる磁束が変化して該突極部に巻回された各発電コイルに電圧が誘起する。

【００２８】図３（Ａ）は、図１において磁石回転子１が時計方向に回転したときに電機子鉄心４の突極部M1

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に流れる磁束φ1 の波形を示したもので、横軸の回転角θは図１に示した状態を原点（θ＝０）としている。この磁束φ1 の波形は、同図からも分かるように、θ＝０の位置に対して、左半部（θ＝－１８０°～０°）と右半部（θ＝０°～１８０°）とが対称な波形となる。突極部M1 に巻回された発電コイルW1 には、該突極部の磁束φ1 の時間的変化により図３（Ｂ）に示す波形の電圧Ｖ1 が誘起する。電機子鉄心４の第１の突極群を構成する他の突極部M3 ，M5 ，M7 ，M9 及びM11を流れる磁束は突極部M1 を流れる磁束φ1 に対して電気角で３６０°（機械角で３６０°／６）ずつ位相が順次ずれた同様な波形となるので、該各突極部にそれぞれ巻回された第１の系統の発電コイルを構成する他の各発電コイルW3 ，W5 ，W7 ，W9 及びW11には、それぞれ図３（Ｃ）ないし図３（Ｇ）に示すように、発電コイルW1 の誘起電圧Ｖ1 に対して電気角で３６０°（機械角で３６０°／６）ずつ位相が順次ずれた同様な波形の電圧Ｖ3 ，Ｖ5 ，Ｖ7 ，Ｖ9 及びＶ11が誘起する。

【００２９】第１の系統の発電コイルの出力端子間に生ずる電圧Ｖa は発電コイルW1 ，W3 ，W5 ，W7 ，W9 及びW11にそれぞれ誘起する電圧Ｖ1 ，Ｖ3 ，Ｖ5 ，Ｖ7，Ｖ9 及びＶ11を加え合わせた合成電圧となるが、この合成電圧Ｖa の６つの正の各半波及び６つの負の各半波は、いずれも１つの発電コイルの誘起電圧（例えばＶ1 ）の６つの正の各半波及び６つの負の各半波をそれぞれ加算したものとほぼ等しくなるので、磁石回転子が１回転する間に第１の系統の発電コイルの出力端間に生ずる電圧Ｖa の波形は図３（Ｈ）に示したように振幅がほぼ一定となる。同様に、発電コイルW2 ，W4 ，W6 ，W8 ，W10及びW12が直列に接続された第２の系統の発電コイルの出力端間に生ずる電圧も、振幅がほぼ一定な波形となる。従って、第１の系統の発電コイルの出力及び第２の系統の発電コイルの出力によりそれぞれランプを一般負荷として駆動した場合に、該ランプにちらつきが生ずることがなく、また一般負荷として他の負荷を駆動した場合にうなり現象などが発生することがない。

【００３０】上記の実施例では、一般負荷用電機子の電機子鉄心が１２極に構成されているが、本発明において、該電機子鉄心の極数は任意であり、一般に２ｎ個（ｎは２以上の整数）の突極部を有する電機子鉄心を一般負荷用の電機子に用いる場合に本発明を適用することができる。

【００３１】例えば図４は８個の突極部M1 ～M8 を有する電機子鉄心４を用いた場合で、突極部M1 ～M8 には発電コイルW1 ～W8 が巻回されている。この場合には、フライホイールの内周に固定された磁石１４～１６の所定の領域が径方向に着磁されて４５度（＝３６０／８度）の角度間隔で並ぶ６個の磁極が形成され、これらの磁極により一般負荷用磁石界磁が構成されている。この例の一般負荷用磁石界磁は、８極の磁石回転子の８個

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の磁極の内の２個の磁極を模擬磁極１１Ｂにより置き換えたものに相当している。

【００３２】図４の実施例においては、電機子鉄心４の１つ置きに配置された４個の突極部M1 ，M3 ，M5 及びM7 に同じ巻き方向で順番に巻回されて直列に接続された４個の発電コイルW1 ，W3 ，W5 及びW7 により第１の系統の発電コイルが構成され、他の１つ置きに配置された４個の突極部M2 ，M4 ，M6 及びM8 に同じ巻き方向で順番に巻回されて直列に接続された４個の発電コイルW2 ，W4 ，W6 及びW8 により第２の系統の発電コイルが構成されている。

【００３３】図５（Ａ）は図４の実施例の突極部M1 を流れる磁束φ1 の波形を示したもので、磁石回転子１の回転角度位置θは図４の状態を原点（θ＝０）として示してある。図５（Ｂ）は突極部M1 に巻回された発電コイルW1 の誘起電圧Ｖ1 の波形を示したもので、この電圧Ｖ1 の波形はθ＝０の位置に対して左半部（θ＝－１８０°～０°）と右半部（θ＝０°～１８０°）とが対称な波形となる。第１の系統の発電コイルを構成する他の発電コイルW3 ，W5 及びW7 にそれぞれ誘起する電圧は、発電コイルW1 の誘起電圧Ｖ1 に対して電気角で３６０°（機械角で３６０°／４）ずつ位相がずれた同様な波形となり、磁石回転子が１回転する間に第１の系統の発電コイルの出力端間に得られる電圧Ｖa の４つの正の各半波及び４つの負の半波は、１つの発電コイル（例えば発電コイルW1 ）の誘起電圧Ｖ1 の４つの正の半波及び４つの負の半波をそれぞれ加算したものとほぼ同じ波形となる。従って磁石回転子が１回転する間に第１の系統の発電コイルの出力端間に得られる電圧Ｖa の振幅は、図５（Ｃ）に示すようにほぼ一定となる。同様に、回転子が１回転する間に第２の系統の発電コイルの出力端間に得られる電圧の振幅もほぼ一定となる。

【００３４】

【発明の効果】以上のように、本発明によれば、等角度間隔で設けられた２ｎ個の突極部を有する一般負荷用電機子の電機子鉄心の１つ置きに配置された突極部にそれぞれ巻回された発電コイルを直列に接続することにより第１及び第２の系統の発電コイルを構成して、該第１及び第２の系統の発電コイルの出力によりそれぞれ一般負荷を駆動するようにしたので、各系統の発電コイルの出力電圧の振幅をほぼ一定にすることができる。従って一般負荷としてランプを点灯駆動する場合には、該ランプが低速回転時にちらつくのを防ぐことができ、一般負荷として他の負荷を駆動する場合にうなり現象などが生ずるおそれをなくすことができる。

【図面の簡単な説明】

【図１】本発明の実施例の全体的な構成を示した構成図である。

【図２】図１における発電コイルの接続図である。

【図３】図１の実施例の磁束波形及び各部の電圧波形を

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示した波形図である。

【図４】本発明の他の実施例の全体的構成を示した構成図である。

【図５】図４の実施例の磁束波形及び各部の電圧波形を示した波形図である。

【図６】従来例における発電コイルの接続を示した接続図である。

【図７】従来の発電機における磁束波形及び各部の電圧波形を示した波形図である。

【符号の説明】

１　フライホイール磁石回転子
２　点火用電機子
３　一般負荷用電機子
４　電機子鉄心
１１　フライホイール

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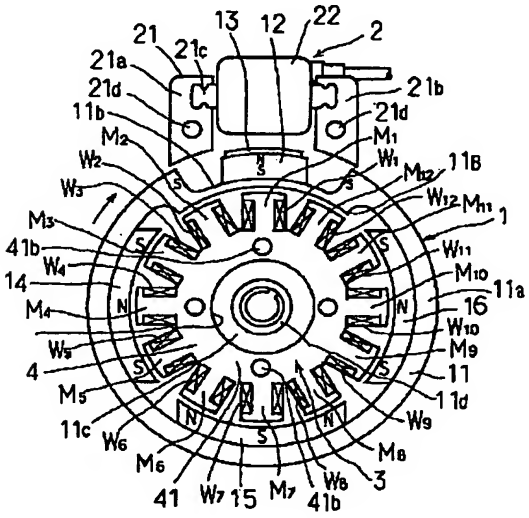
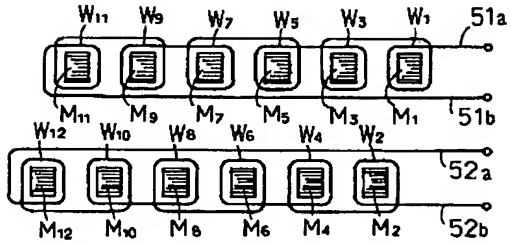
１１ａ　周壁部
１１ｂ　磁石取付け用凹部
１１Ｂ　模擬磁極
１１ｃ　底壁部
１１ｄ　ボス部
１２　永久磁石
１３　磁極片
１４～１６　永久磁石
２１　鉄心
２１ａ，２１ｂ　鉄心脚部
２１ｃ　棒状鉄心部
２１ｄ　取付け孔
２２　発電コイル
４１　継鉄部
５１ａ，５１ｂ，５２ａ，５２ｂ　引出線

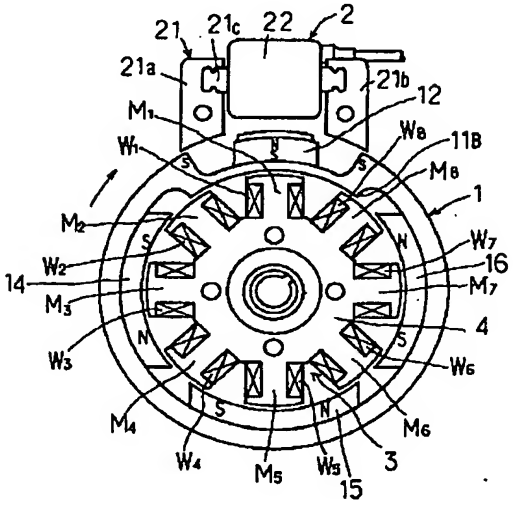
【図１】



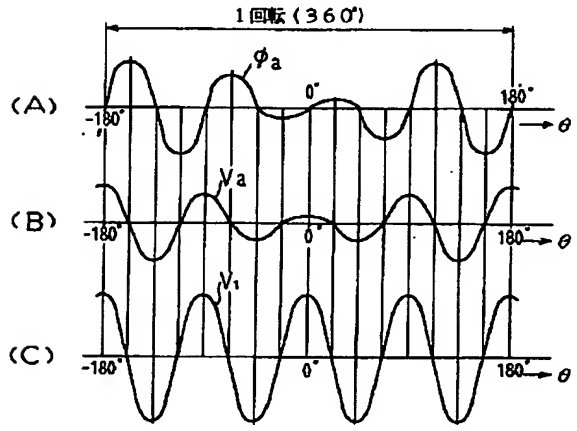
【図２】



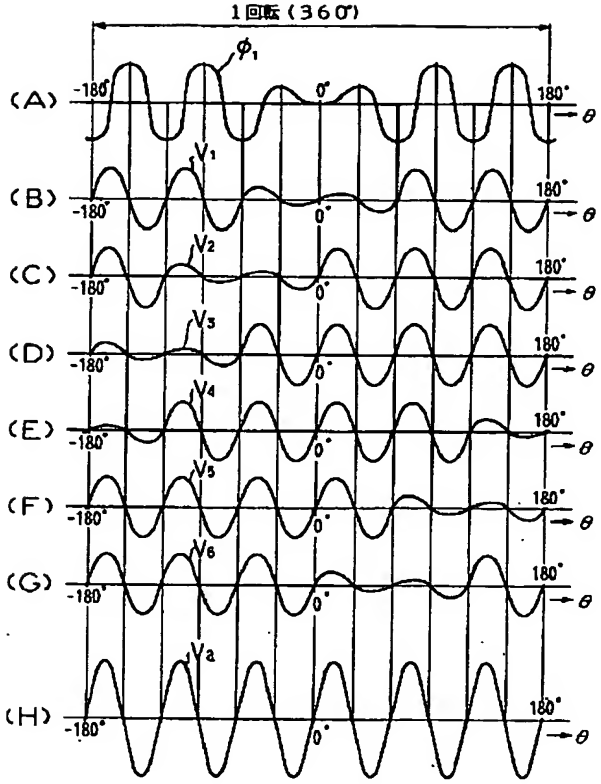
【図４】



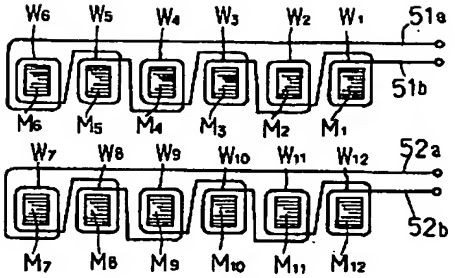
【図５】



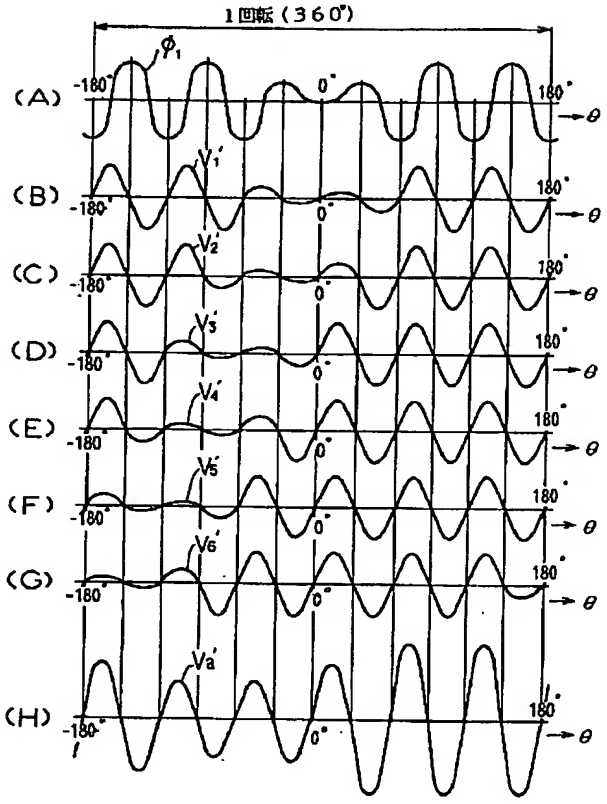
【図３】


1回転（360°）
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
-180°
0°
180°
θ

【図６】


W6 W5 W4 W3 W2 W1
51a
51b
M6 M5 M4 M3 M2 M1
W7 W8 W9 W10 W11 W12
52a
52b
M7 M8 M9 M10 M11 M12

【図７】


1回転（360°）
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
-180°
0°
180°
θ